SECTION 262416

BRANCH CIRCUIT PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.2 WORK INCLUDED

A. Panelboards

1.3 SUBMITTAL AND RECORD DOCUMENTATION

A. Submit under provisions of Section 26 05 00.

B. Approval documents shall include drawings. Drawings shall contain overall panel dimensions, interior mounting dimensions and wiring gutter dimensions.

1.4 OPERATIONS AND MAINTENANCE MATERIALS

A. Submit under provisions of Section 26 05 00.

B. Provide installation instructions and NEMA Standards Publication PB 1.1 (Operations and Maintenance Manual) with each panel board.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with NECA Standard of Installation, NEMA PB 1 and NFPA 70.

1.6 FIELD MEASUREMENTS

A. Verify field measurements are as indicated on the Shop Drawings for proper installation of panelboards in accordance with this specification.

B. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping and encumbrances to workspace clearance requirements.

1.7 MAINTENANCE MATERIALS

A. Provide maintenance materials under provisions of Section 26 05 00.

B. Provide two of each panel board key.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Square D

B. Cutler-Hammer

C. Siemens-ITE

2.2 RATINGS

A. Panelboards shall be rated as indicated on the drawings. Continuous main current ratings shall be as indicated on associated schedules. Integrated minimum short circuit ratings shall be in RMS symmetrical amperes at the rated voltage.

2.3 INTERIORS

A. Provide one continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors suitable for bolt-on branch circuit breakers. The bussing shall be fully rated. Bussing shall be Copper.

B. All current carrying parts shall be insulated from ground and phase-to-phase by Noryl high dielectric strength thermoplastic or equivalent.

C. Split solid neutral shall be plated and located in the main compartment up to 225 amperes so all incoming neutral cables may be of the same length.

D. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have pre-formed twist outs covering unused mounting space.

E. Metal nameplates shall be secured to dead-front with rivets or screws. Sticker or foil nameplates are not permitted. Voltage characteristics, ampere rating, UL listed label and short circuit current rating shall be displayed on the interior.

F. Interiors shall be field convertible for top or bottom incoming feed. Main and sub-feed circuit breakers shall be vertically mounted. Main lug interior up to 400 amperes shall be field convertible to main breaker. Interior leveling provisions shall be provided for flush mounted applications.

G. Furnish mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.

H. Provide separate equipment grounding conductor terminal bar bonded to the panelboard for the termination of feeder and branch circuit equipment grounding conductors.

2.4 MAIN CIRCUIT BREAKER

A. Molded case circuit breakers shall have an over-center, trip-free, toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have a permanent trip unit with thermal and magnetic trip elements in each pole. Each thermal element shall be factory calibrated to operate in a 40 degrees Celsius ambient environment. Thermal elements shall be ambient compensating above 40 degrees Celsius.

B. Two and three pole circuit breakers shall have an internal common trip crossbar to provide simultaneous tripping. Circuit breakers frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the breaker, which allows the user to simultaneously select the desired trip levels of all poles. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.

C. Breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL listed for reverse connection without restrictive line or load markings.

D. Circuit breaker escutcheon shall have International I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the “ON” or “OFF” position.

E. Lugs shall be UL listed to accept solid or stranded copper conductors. Lugs shall be suitable for 75 degrees Celsius rated wire sizes.

F. Fault current series rated type breakers are not acceptable.

2.5 BRANCH CIRCUIT BREAKERS

A. Breakers shall be UL listed with amperage ratings, interrupting and number of poles as indicated on the panel schedules.

B. Molded case branch circuit breakers shall have bolt-on type bus connectors.

C. Circuit breakers shall have an over-center toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Two and three pole circuit breakers shall have an internal common trip crossbar to provide simultaneous tripping.

D. There shall be two forms of visible trip indication. The breaker handle shall reside in a “TRIPPED” position between “ON” and “OFF”. In addition, there shall be a VISI-TRIP indicator appearing in the clear window of the circuit breaker housing.

E. The exposed faceplates of all branch circuit breakers shall be flush with one another.

F. Where indicated, breakers shall be UL listed for use with the following factory installed accessories: Shunt Trip; Auxiliary Switch; Alarm Switch.

G. Fault current series rated type breakers are not acceptable.

2.6 ENCLOSURES

A. Type NEMA 1 Boxes
   1. Shall be galvanized steel. Galvanealed steel will not be acceptable.
   2. Boxes shall have removable end walls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.
   3. Minimum box dimensions shall be 20 inches wide by 5 ¾ inches deep.

B. Type NEMA 1 Trim Fronts:
   1. Shall have ANSI 49 grey enamel electrodeposited over cleaned phosphatized steel.
   2. Trim fronts shall be one piece with door. Mounting shall be as indicated on associated panel schedules on the drawings. Multiple section panels shall have a separate trim front for each section.
   3. Panelboards rated 225 amperes and below shall have MONO-FLAT fronts with concealed door hinges and trim screws. Front is not removable with the door locked. Panelboards rated above 225 amperes shall have fronts with trim clamps and concealed door hinges. Trim front doors shall have rounded corners and edges shall be free of burrs.
   4. Front shall have cylindrical tumbler lock with catch and spring loaded stainless steel door pull. All lock assemblies shall be keyed alike. Two keys shall be provided with each lock. A clear plastic directory cardholder shall be mounted on the inside of door.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards in accordance with manufacturer's written instructions, NEMA PB 1.1 and NEC standards.

B. Install panelboards plumb. Install recessed panelboards flush with wall finishes. Provide supports in accordance with Section 26 05 29.

C. Anchor panelboards to structure and make branch circuit connections.

D. Coordinate the panelboard bus ratings and circuit breaker coordination rating with the available fault current.

E. Provide engraved laminated nameplates and panelboard directories under the provisions of Section 26 05 53.

F. Provide spare conduits out of each recessed panelboard to an accessible location at the structure. Minimum spare conduits: three empty one inch. Identify each as "SPARE".

G. For all indicated scheduled emergency and normal/emergency panelboards, Contractor shall provide breaker locks on all branch circuit breakers associated with respective panel.

H. Enclosures for over-current devices shall be mounted in a vertical position unless that is impractical; circuit breakers may be installed horizontally as long as the up position of the handle is the “on” position.

I. Not more than 42 overcurrent devices of a lighting and appliance branch circuit panelboard shall be installed in any one cabinet or box. A lighting and appliance branch circuit panelboard is one in which more than 10 percent of the installed overcurrent devices are rated is 15, 20 or 30 amperes and supply circuits with a neutral conductor.

J. Mounting heights: Top of trim - 74 inches above finished floor unless noted otherwise.

K. All branch circuits that supply electric heat tracing shall be protected by ground-fault equipment protection circuit-interrupters (GFEPCI).

3.2 FIELD QUALITY CONTROL

A. Inspect complete installation for physical damage, proper alignment, anchorage and grounding.

B. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads within ten percent of each other. Maintain proper phasing for multi-wire branch circuits.

C. Check tightness of bolted connections, and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer’s written specifications.

3.3 APPLICATION

A. Circuit breakers used as switches in 120 volt and 277 volt florescent lighting circuits shall be listed and shall be marked SWD or HID. Circuit breakers used as switches in high intensity discharge lighting circuits shall be listed and shall be marked as HID.

B. Provide UL listed (UL489) circuit breakers for use with heating, air conditioning and refrigeration equipment comprising multimotor or combination loads are marked “Listed HACR Type”. Where the equipment marking specifies fuses or “HACR Type” circuit breakers the circuit is intended to be protected only by the type of protection device specified.

3.4 DELIVERY, STORAGE AND HANDLING

A. Inspect and report concealed damage to carrier within their required time period.

B. Handle carefully to avoid damage to panel board internal components, enclosure and finish.

C. Store in a clean, dry environment. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect enclosure(s) from dirt, water construction debris and traffic.

END OF SECTION